ISSN 2349-7203

IJPPR
INTERNATIONAL JOURNAL OF PHARMACY & PHARMACEUTICAL RESEARCH
An official Publication of Human Journals

HUMAN

Human Journals
Review Article
April 2016 Vol.:6, Issue:1

A Review on Screening of Novel Oxazine Derivatives for Certain Pharmacological Activities

ISSN 2349-7203
IJPPR
INTERNATIONAL JOURNAL OF PHARMACY & PHARMACEUTICAL RESEARCH
An official Publication of Human Journals
HUMAN

Mathew George [1], Lincy Joseph [2], Hithin Raj.Sadanandan[2*]

[1]Department of Pharmacology, Pushpagiri College of Pharmacy, Thiruvalla-689107, Kerala, India.

[2]Department of Pharmaceutical chemistry, Pushpagiri College of Pharmacy, Thiruvalla-689107, Kerala, India.

Submission: 31 March 2016
Accepted: 5 April 2016
Published: 25 April 2016

Keywords: Oxazine, Antimicrobial, Antitubercular, Antitumour, Antiinflammatory

ABSTRACT

Oxazine derivatives are an important class of heterocycles, which has attracted much synthetic interest due to their wide range of biological activities. Oxazine is a heterocyclic compound can be formally derived from benzene, and its reduction products, by suitable substitution of carbon (and hydrogen) atoms by nitrogen and oxygen. In the last few years, oxazine derivatives have proved to be valuable synthetic intermediates and also possess important biological activities like sedative, analgesic, antipyretic, anticonvulsant, antitubercular, antitumour, antimalarial and antimicrobial. These days, development of drug resistance is a major problem and to overcome this situation, it is necessary to synthesize new classes of compounds.

HUMAN JOURNALS

www.ijppr.humanjournals.com

INTRODUCTION

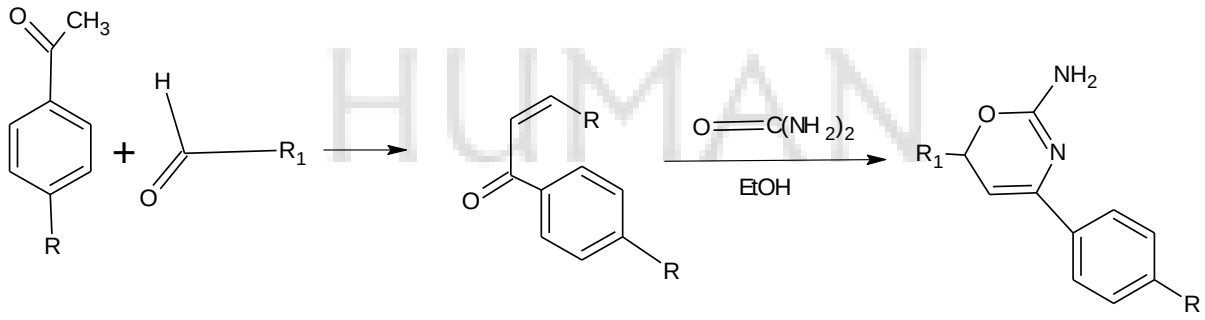
Many heterocyclic analogous of chalcones have been synthesized and subsequently demonstrated to possess biological and pharmacological activities, which may possibly result in chemotherapeutic agents. Because of great potentiality, the heterocyclic analogous of chalcones are most helpful synthons. In the view of the varied biological and pharmacological application, we synthesized some heterocyclic derivatives of chalcones. Chalcones found to possess various activities like antimicrobial, anti-inflammatory, Analgesic, anticancer, antimalarial, antiviral, antileishmanial, antioxidant, antitubercular, antiulcer, antihyperglycemic. In recent years, attention has increasingly been given to the synthesis of oxazine derivatives as a source of new antimicrobials. The synthesis of novel oxazine derivatives remains the main focus of medicinal research. Oxazine derivatives have been reported to possess antifungal, antibacterial, cytotoxic, antiviral and analgesic activity. Oxazine derivatives have played a crucial role in the theoretical development of heterocyclic chemistry and are also used extensively in organic synthesis. Due to the rapid development of bacterial resistant to antibacterial agents, it is vital to discover novel scaffold for the design and synthesis of new antibacterial agents to help in the battle against pathogenic microorganisms. Much research has been carried out with the aim to discover the therapeutic value of chalcones.[3]

Oxazines are heterocyclic compounds containing one oxygen and one nitrogen. Many isomers exist depending on the relative position of the heteroatoms and relative position of the double bonds. 1,3-Oxazines attract more attention as they constitute an important class of both natural and non-natural products. Heterocycles containing the oxazine nucleus were found to possess a wide range of valuable biological properties like analgesic, anti-inflammatory, anti-leukemic, antimalarial 1-3, antipyretic, anticonvulsant and antimicrobial activities 4-8. Benzo-1,3-oxazines are also known to be biologically active, demonstrating anti-rheumatic, antianginal, antihypertensive effects, cytotoxic, and anti-osteoclastic bone resorption activity. Efavirenz, a trifluoromethyl-1,3oxazin-2-one, is a non-nucleoside reverse transcriptase inhibitor which displays significant activity against HIV-1 mutant strains. 1,3-Oxazine derivatives are also known to function as progesterone receptor agonists. Naphthoxazines are found to possess psycho-stimulating and antidepressant activity and are used in the treatment of Parkinson's disease. Only few reports are available regarding the antimicrobial activity of 1,3-oxazines.

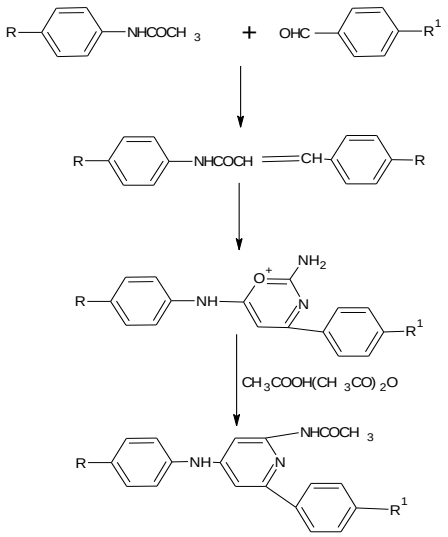
Hence, there is enough scope to explore new oxazine derivatives for their antibacterial & antifungal activity.

LITERATURE REVIEW

1.**Sunil Dhanya**,et al in 2013, a new series of 4-(4-substituitedphenyl)-6-substituited-6H-1,3-oxazines 2a-f have been synthesized from acid catalyzed reaction between chalcones 1a-f and urea. The structures of all compounds were confirmed by advanced spectral techniques like IR, 1HNMR and mass spectroscopy. The purity of the compounds was checked by thin layer chromatography and elemental analysis. Excellent antibacterial activity was exhibited by 2f against gram +ve bacteria. 2c and 2e were found to be highly sensitive against gram –ve bacteria. 2b and 2f displayed excellent antifungal activity. The quantitative structure activity relationships (QSAR) studies of these compounds were performed using Easy QSAR 1.0 by simple linear regression analysis. The logarithm of zone of inhibition of microorganisms was used as key properties to evaluate the QSAR models. The best correlated QSAR model was depicted that the autocorrelation charge 1 (ATSc1) and Crippen's molar refractivity (Crippen MR) from PaDEL Descriptor 2.13 were significant for the antibacterial activity of oxazines against *S. aureus* and *E. coli* respectively. A close correlation between the observed and predicted antibacterial activities (Log ZOI values) for the compounds indicated the development of the best QSAR model.[5]

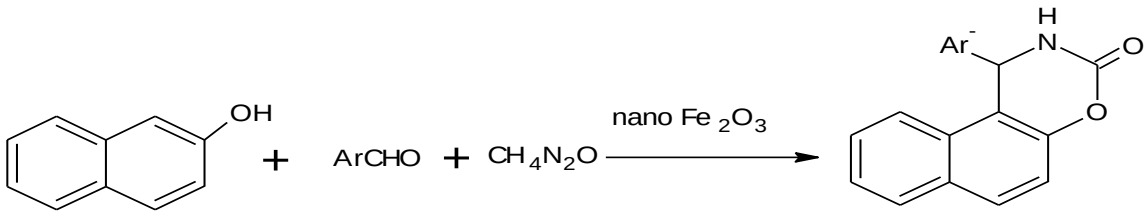


2.**Beena K. P.** et al 2013,a series of [6-(p-substituted aminophenyl)-4-(p-substituted phenyl)—6H-1,3oxazin-yl]-acetamides were synthesized via Claisen-Schmidt condensation. The titled compounds were characterized by IR, NMR analysis. The synthesized compounds were screened for their antibacterial and antifungal activity disc diffusion method. Among the synthesized compounds, A-2 was found to have a strong antibacterial and antifungal activity. Compounds A-1, A-3, A-4 and A-5 were found to have promising antimicrobial activity.[6]



3.Sayaji.S et al in 2013, A series of novel 2-[2-Amino-4(4-bromophenyl)-6H-1,3-oxazine-6-yl]-4-{3-[2-amino-4(4-bromophenyl)-6H-1,3oxazine-6-yl]-4-hydroxybenzyl}phenol derivatives [3a-3i] were prepared from Bis[3-[(E)-3(4-bromophenyl)-3-oxo1-propenyl]-4-hydroxyphenyl]methane [2a-2i] with urea and potassium hydroxide in ethanol. All synthesized compounds were characterized on the basis of IR,NMR spectroscopic data and Elemental Analysis. Antimicrobial activity was evaluated and compared with the standard drugs, some compounds of the series exhibited promising anti- bacterial and anti-fungal activity compared to standard drugs.[7]

4.Farhad Hatamjafari et al A Facile One-Pot Solvent-Free Synthesis of 1,2-Dihydro-1 arylnaphtho [1,2-e] [1,3] oxazine-3-ones Received: 29 March 2014; Accepted: 2 June 2014 His study aimed to synthesis of some 1,2-Dihydro-1-arylnaphtho [1,2-e] [1,3] oxazine-3-ones. The question this study tried to answer was this reaction can be performed in present of nano-Fe2O3 as an acid catalyst and solvent-free conditions or not. Therefore, to find answer to the question, some of the1,2-Dihydro-1-arylnaphtho [1,2-e] [1,3] oxazine-3-one derivatives with medicinal properties were synthesized with rapid, high yield, novel, facile, and one-pot condensation of β-naphthol, aromatic aldehydes and urea using by nano-Fe_2O_3 under solvent-free conditions. The one-pot synthesis on solid inorganic support provides the products in good yields. The synthesized some of oxazine-3-one derivatives have been reported. Nano- Fe_2O_3 was reused for four runs without significant loss of activity and the effect of solvents on the model reaction was carried out in various solvent.[8]



5. **Ramesh L. Sawant** et al in 2012 A new series of Schiff bases of 1, 3-oxazines were synthesized in three steps. In the first step, 4bromoacetophenone and substituted aromatic aldehyde reacted in the presence of sodium hydroxide to give substituted chalcones (Claisen-Schmidt condensation). In second step, substituted chalcones reacted with urea to produce 4-(4-bromophenyl)-6-(substituted phenyl)-6H-1,3-oxazin-2-amine analogues. In third step, these compounds were reacted with substituted aromatic aldehydes to produce 4-(4-bromophenyl)-6(substituted phenyl)- 2-{[(1E) (substituted phenyl) methylidenene]}-6H-1,3-oxazin-amine. The newly synthesized compounds were characterized by IR, NMR and screened for their antimicrobial activity against *Staphylococcus aureus, Escherichia coli* and antifungal activity against *Candida albicans*. The study revealed that compounds exhibited excellent antibacterial as well as antifungal activity.[9]

CONCLUSION

Oxazine and related heterocyclic compounds were reported to have antimycobacterial, antibacterial, antifungal, anticoagulant, anticancer, antioxidant, and cytotoxic activities. It has been found that oxazine derivative can be synthesized in a number of ways. So this review article can extend the synthetic utility of new heterocyclic oxazine derivatives. Therefore, biological significance of oxazine compounds could be utilized for the development of new chemical entities to various diseases.

REFERENCES

1. Sindhu T J et al. International Journal of Pharma Sciences and Research (IJPSR)
2. Anil NM. Synthesis and antimicrobial study of new 8-bromo-1,3diaryl2,3dihydro1Hnaphthol[1,2e][1,3] oxazines,Int. J. Chem. 2011: 74-86.
3. P.Anusha1etal,Volume4,International Journal of Pharma Sciences and Research,Issue1 , 886-895.
4. Iran Sheikhshoaie et al. ISSN 1011-3924 Printed in Ethiopia . Chem. Soc. Ethiop. 2010, 24(2), 283-287.
5. Sunil Dhanya et al .Research Journal of Pharmaceutical Sciences February 2013:Vol. 2(2), 15-19.
6. Beena K et al .Design, synthesis, characterization and evaluation of some 1,3-oxazine derivatives as potent antimicrobial agents 2013: 5 (4):257-260.

7. Sayaji.S et al Novel synthesis and antimicrobial activity of bis-oxazine derivatives.Journal of Chemical and PharmaceuticalResearch,2013:5(5):271-274.
8. Farhad Hatamjafari et al .A Facile One-Pot Solvent-Free Synthesis of 1,2-Dihydro-1 arylnaphtho [1,2-e] [1,3] oxazine-3-ones 2014.
9. Ramesh L. Sawant et al Synthesis And Antimicrobial Activity Of Schiff.Bases.Of.1,3Oxazines.International Journal of PharmTech Research,2012:Vol.4, No.4, pp 1653-1659.